VOL. XXXI, No. 9. September, 1961.

AGRICULTURAL BULLETIN

PUBLISHED BY THE
BERMUDA DEPARTMENT OF AGRICULTURE and FISHERIES
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THE DEPARTMENT OF AGRICULTURE AND FISHERIES

The Board of Agriculture and Fisheries (Additional Duties and change of name) Act, 1961, came into effect on the 1st August, 1961. The Act, likewise, changed the name of the Department of Agriculture to the Department of Agriculture and Fisheries, and the Director of Agriculture became the Director of Agriculture and Fisheries. The administration and control of the Aquarium and Museum was also transferred to the Board of Agriculture and Fisheries, and the Curator of the Aquarium and Museum became Chief Fisheries Officer and Curator of the Aquarium and Museum. Provisions were also made for the appointment of a Fisheries Officer. A special meeting of the Board of Agriculture and Fisheries was held at 4.30 p.m. on the 1st August, at which time two Italian cypress trees were planted in the Aquarium grounds, and a plaster cast fish, a dolphin, was unveiled, which had been mounted on the wall of the Board room in the Botanical Gardens, to make the combination of Agriculture and Fisheries.

This ceremony thus brought to a close a subject freely discussed in public circles for many years. In 1952, the Board of Agriculture prepared a scheme to take over the control of Fisheries, but at that time the Legislature thought it preferable to transfer the administration of the Fisheries and Aquarium from the Board of Trade to the Trade Development Board.

The Trade Development Board soon realised that Fisheries should be under the control of a Department of Government dealing in natural resources, and in 1958 began pressing for the transfer of Fisheries, to the Board of Agriculture. This transfer was one of the recommendations made by Dr. J. E. Bardach, Associate Professor Department of Fish and Department of Zoology, University of Michigan, who, at the request of the Trade Development Board, prepared three reports 1955, 1956 and 1958 titled "The Bermuda Fisheries Research Programme". In his final report Dr. Bardach said, "The fishing industry should be placed under the existing Department of Agriculture, and the Director of Agriculture should become the administrative head of Agriculture

and Fishery''. He also recommended that a full time fishing officer be appointed, with training and experience in fishery biology, boat maintenance, internal combustion engine mechanics, refrigeration machinery techniques, and marketing of fish.

The Board of Agriculture and Fisheries in undertaking these new duties fully realise that little progress can be made until a full time Fisheries Officer is appointed, and the task of finding a suitable person for this office has already begun. Preliminary discussions have been held with representatives of both the commercial and game fishing interests, to determine how the Board can best serve the interests of the fishing industry.

The Department of Agriculture and Fisheries will, likewise, do everything within the limits of their capabilities to efficiently carry out these new duties, but at the same time there must not be any relaxation on the part of the staff in so far as the agricultural and horticultural duties are concerned. The Aquarium and Museum must also be maintained on the highest plane of efficiency. These are vitally important functions of the Department and will continue to be zealously performed. At the same time, every effort will be made to render assistance to the fishing industry, but this will require patience on the part of the general public. When a fisheries officer has been found there will be a great deal of preliminary work to undertake, and a very careful study of the requirements of the industry will have to be made in order to give useful and proper guidance.

G. R. G.

ZERO GRAZING OF DAIRY CATTLE

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(It is the conviction of the Department of Agriculture that a gradual shift will have to be made to the pen system of dairy farming in Bermuda, if this industry is to continue as the most important phase of local agriculture. With this in mind information on zero grazing of dairy cattle will appear in this bulletin from time to time.)

> Zero grazing is the modern term for the old practice of soiling. Experiments at the University of Edinburgh dairy unit suggest that there may be much to be said for taking grass to the cows instead of the usual grazing.

Zero grazing is a system of feeding in which grass is cut and carted to dairy cows housed in yards and paddocks. Silage is interchangeable with fresh grass, and in parts of the U.S.A. it is fed all the year round. There is nothing new about the system, which is aimed at increasing the intensity of grass management by improving the efficiency of production. It is based on the old British and European practice of soiling grass, which in Britain has died out, since it involved so much hand labour. Renewed interest in it has returned from America through recent developments in mechanical forage harvesting and handling. At first it was used only in irrigated areas to make the maximum use of forage produced on irrigated pastures, but latterly it has spread to other parts of the States.

The advantages claimed for zero grazing are: improved utilizations of the grass crop, increased production per animal, better use of land, simplified farm layout and fencing, and control of bloat. Damage to pasture swards by treading dung in and urinating is avoided — it has been estimated that 20 per cent of grass may be so wasted (droppings alone may cover 10 per cent) — although intensive use of an electric fence and the alternate cutting and grazing of pastures can, of course, reduce these figures. The selective grazing by animals is avoided when stem and leaf are cut together. Increases in output of 20-30 per cent have been estimated where zero grazing has been introduced in America.

There is evidence in the United States of an increase in milk production per cow when grass is fed in yards. The animal expends little energy in obtaining her feed and thus more is avilable for production. Zero-grazed animals also put on greater weight during the summer months than those out grazing.

Land utilization is improved because a smaller acreage may be required to maintain the same number of animals, or more milk can be produced on the same acreage. The surplus acreage can keep more cows or produce more cash crops.

The need for water supplies and fencing in all fields is removed, and fields distant from the steading and previously inaccessible to the dairy herd can be used for feeding. This allows a more balanced rotation with grass leys to be practised all over the farm.

The incidence of bloat has been reduced, since selective grazing by the animal is prevented. When material likely to cause bloat has to be fed, the quantity offered can be reduced and a more fibrous supplement provided. Grass quality is easier to control by cutting than by grazing, and there appear to be less day-to-day variations in milk yield than under certain grazing systems. The disadvantages of the system are that the feed must be harvested daily and in all kinds of weather, increased operating and equipment costs are incurred, cattle housed indoors require more attention than those out grazing, more straw is needed for bedding, and the intensity of production is increased, which means that additional management worries may arise.

It is unlikely that there will be many days when the grass cannot be cut, but this depends on soil conditions and rainfall. The damage to wet pastures is not likely to be greater than that caused by animals grazing. There may, however, be some discomfort to the men involved. If the grass cannot be harvested, then some succulent substitute must be available: the feeding of silage made from grass of similar quality to that fed green causes no apparent drop in milk production.

Equipment:

Efficient machinery is essential for this system — a forage harvester and ideally, a self-unloading trailer to deliver grass directly into the troughs. The cost of operating a forage harvester depends on the number of hours worked during the season. Where silage is made, operating costs are reduced. If the dairy staff can cut and feed the grass, the expense is further reduced, but it may be more convenient for the arable staff to cut the grass and the dairy staff to feed it. This allows the forage harvester to be used continually by

one man — a very important factor in its satisfactory maintenance. The machinery must be reliable, and some alternative method of cutting the feed is necessary when breakdowns occur. The presence of a second harvester puts up costs. The simpler the machine, with the minimum number of moving parts, the less likelihood there is of a breakdown and the better it is for this system.

The time required to move cows to and from pasture and to move electric fences (which may easily be 1½ hours a day) can be set against the time required to feed the grass. The yards where the cattle are housed will have to be cleaned; the time this takes will vary with the system, and with mechanical aids it may be very small.

The straw needed for bedding will be doubled over the year. There may be a problem in grassland areas where bedding straw is not plentiful, and, of course, where straw has to be bought operating costs will be increased. However, the value of the increased dung production can be set against this.

The forage harvester required is a direct cut machine, since speed of cutting is essential. The higher the throughput and the wider the cut of the machine the better, as frequently short grass may be cut and a larger area will have to be cut to get the necessary tonnage. The trailer should be pulled behind the harvest forester, so that one man can work both. A tractor of at least 35-40 h.p. is required.

When the number of cows is below 20, the trailer itself may be adapted and left in the yard so that the cows can feed directly from it. Greater numbers should be fed from troughs, which should be outside the yard, eliminating the need for the tractor to go among the cows. The size of the troughs will depend on the number of times the cows are fed each day. It is most common to feed twice daily, although in certain cases it has been done more often. Once-a-day feeding requires larger troughs, and here there may be a risk of the grass beginning to heat. It also necessitates cutting every day, because if the loads for say, Sunday, are cut on Saturday they will have heated by the next day and will be less palatable — and that means less milk.

The troughs should be wider at the top than at the bottom — 3 feet 6 inches tapering to 2 feet 3 inches. The height on the yard side should be 2 feet and the back should be high enough to prevent the animals nosing the grass over it. A sloped board at the top makes it easier to fill the troughs. If a self unloading trailer is used, the height of the troughs will be determined by the delivery height of the machine. It is desirable to have vertical stanchions 1 foot 9 inches to 2 feet apart, through which the animal must put its head to feed. This reduces the wastage caused by animals drawing grass amongst their feet. The floor of the trough should be flat so that cleaning out any residue is easy. When animals are fed in a paddock as opposed to a yard, a concrete feeding platform at least 10 feet wide is necessary. The platform and the yard should drain away from the troughs.

Midlothian trial:

At Langhill Farm, Roslin, the dairy unit of the Edinburgh School of Agriculture, an experiment has been started to investigate zero grazing under British conditions; to compare its production with that of a strip grazing and

to determine its costs of operation. The dairy herd, half Ayrshire and half Friesians, has been split into two groups, 38 being run in a semi-loose housing yard where grass is fed and approximately 38 being housed in a traditional byre and strip grazed during the summer. A further experiment is measuring the suitability of this open yard housing under Scottish conditions and comparing it with the traditional method of housing.

The cattle have been zero grazed since May, 1956. An outline of some results obtained in the period April 11th-October 24th, 1957, are given below:—

Number of milking cows	38
Number of days	197
Average daily consumption	145 lb. fresh grass 26.4 lb. dry starch matter 15.44 lb. starch equivalent 2.87 lb. digestible crude protein
Total milk production	170,515 lb.
Average production per cow	4,488 lb.
Average production per cow per day	22.7 lb.
Concentrates fed in period to milking cows	94 cwt.
Milk production per cow from grass	4,000 lb.
Average production per cow per day from grass	20.3 lb.
Acreage required to feed cows	32
Production per acre	247 grazing days and 4,752 lb. milk

While the production per acre may be considered reasonable, the average daily production is lower than in many cases because the herd is predominantly autumn calving. Higher yields could be achieved, for the potential exists in the quality of the daily grass intake.

The concentrate feeding to the cows during the period April 11 to October 24 was 94 cwr, of which 74 cwt was fed in April, September and October. Some of the concentrates fed were bruised oats, given to ensure the consumption of calcined magnesite by the cows and to quieten nervous cows in the parlour. These concentrates have been given a milk-producing value which makes the milk production from the grass lower.

The actual grass feeding was from April 4 to November 11, which is considerably longer than usual in the east of Scotland.

Cutting and carting at 11s. per ton.

Cutting was carried out by the arable staff and feeding mainly by the dairy staff. Two-wheeled trailers with a capacity of 30 cwt. of grass were used, which necessitated two loads per day. The fields cut were approximately one mile from the steading, and the daily time for cutting and carting was 2½ hours. The actual cutting time was only 30-35 minutes. A direct-throw forage harvester was used, and cut over 1,200 tons of grass in the season. The machine charge was 1s. 10d. per ton of grass. The total cost of cutting and carting under our system was approximately 11s. per ton.

(Reprinted from "Agriculture," June, 1958.)

TULA VALLEY NURSERY

As announced in the local press recently, the Department's plant nursery is being transferred to Tula Valley, Spanish Point. Previously, it was expected to open this new nursery for business on the 2nd October, but now, due to moving operations, it will be opened a week later, Monday, 9th October. From that date, however, all plant sales and distribution will be carried out at Tula Valley, and not at the Botanical Gardens. It is hoped that our customers and friends will not find this change inconvenient. Better parking facilities exist at Tula Valley than in the Botanical Gardens, and visitors and intending buyers will find the plants much easier to inspect.

It is also planned to keep the nursery open on Thursday afternoons with effect, as from Thursday, 12th October. This, we believe will be a great help to many people, who are not able to visit the nursery at other times.

Mr. D. J. Moore will continue to supervise all plant propagation work in addition to his duties as Superintendent of the Botanical Gardens; while Mr. W. Kuhn will be in charge of plant sales and distribution, and will be available at Tula Valley during official hours. The new telephone number will be announced shortly.

The nursery at the Botanical Gardens will close on Saturday, 30th September. The following week moving operations will be in progress, so that it will not be possible to keep the nursery open for business during that week, but as previously stated the nursery will be re-opened at Tula Valley on Monday, 9th October.

WONDER APPLE TREES UNDER TRIAL

The most recent plant introduction to the Montpelier Arboretum is the "Wonder Apple Tree". This tree has a fascinating history dating back to 1936. It is claimed that this apple is a "Wonder Tree", possessing unusual habits of growth, flowering and fruiting. I feel it is worth while to mention this tree now, because of its unusual qualities and adaptability. The trees planted in the Arboretum are from a small consignment purchased by the Department of Agriculture from South Africa for trial purposes.

Mrs. Caroline Hopkins and her husband were enjoying a walking tour of the Magaliesburg area of the Transvaal in 1936. While passing through a bushy cutting in the land they spotted a two year old apple tree growing wild amongst the vegetation. It was then the middle of the bitterly cold Transvaal winter, and this young apple tree was a magnificent colour of green and laden with fruit. The apples were not so large as those found on the commercial market today, but they were exceptionally sweet and flavoursome.

Carefully, the two adventurers dug up the tree, which later found itself in a nursery located in Cape Province, Union of South Africa. Years were spent cross pollinating this tree with other apples, until a red-cheeked golden apple was produced. Unusual as it may seem, the golden coloured apple appeared on the tree at the same time as smaller less mature fruit, as well as various stages of blossoming. Yes, the Wonder Apple produces flowers as well as fruit throughout the year.

The "Wonder Apple" (R.E.99) scorns frost and is truly an evergreen. Under trial in many different climatic zones of Africa the apple tree produced very good results. It has been tested in the torrid Karroo, cold highveld, temperate lowveld and sub-tropical northern provinces. It has produced its golden fruit in a wide range of soil conditions. At the home nursery in the Union of South Africa eleven month old trees have produced fruit, and at eighteen months they reach maturity.

J. HUBERT JONES,
Horticulturist.

GARDEN CALENDAR FOR SEPTEMBER

General

Wet weather continued throughout July and early August. Consequently plant growth was very lush and prolific. This condition has brought along a set of problems of its own, which it is as well to consider for a moment.

Soft sappy growth is particularly prone to attack by all manner of pests and diseases. For this reason, a very close watch must be kept, especially where a particular favourite or special plant may be involved. With young sapling trees, shrubs and herbaceous plants, one infestation of a particular pest can kill the plant or set growth back considerably. For this reason, prevention is better than cure.

Another problem involved is the damage that can be caused to such soft growth later in the year from wind and the inevitable accompanying salt spray. This is best approached by avoiding overfeeding particularly with plant food, high in nitrogen content. Excessive nitrogen feeding can only lead to softer growth. Most manures and compost are higher in nitrogen than the other principle plant foods. Whilst their use is beneficial at other times of the year, this is the period to avoid them. Use of artificial fertilizer high in nitrogen should also be avoided and only balanced fertilizers used, if they are required.

If these facts can be borne in mind, then this excessive growth can be used to advantage. If such wood is allowed to ripen and harden, then it can be of value, particularly where young plants have been put out.

The weed problem mentioned in the August bulletin has been further aggravated by the damp weather and the points previously mentioned still hold good. There is, however, no advantage to be gained by walking over very wet ground, weeding. This should be avoided on saturated soil, as the constant passage of feet and wheelbarrows, etc., does much to destroy soil tilth. This is particularly so on heavier soils, such as those found in parts of Southampton and Warwick Parishes.

VEGETABLE GARDEN

September is the month to plant vegetable seeds if you want to get an early supply of produce. The first two or three weeks of September can be very hot and dry so adequate facilities for frequent and regular watering of seed beds must be available. It is a wise practice to disinfect the soil in seed beds to reduce the losses caused by dampening-off and other soil-borne diseases

and pests. A simple method of soil sterilization calls for the use of 1 part of 40% formaldehyde in 50 parts of water. Use the resulting solution at the rate of one-half gallon per square foot of surface area. Cover the treated area with damp bags or cloth for 48 hours. At the end of this time remove the covering and fork over the soil. Planting of seeds can follow in 14 days.

Some suggestions as to what to plant at this time follow: Beans (String or snap), Beets, Carrots, Radish, Spinach, White Turnips. All of the above vegetables can be planted in situ and need only be thinned to desired thickness.

Broccoli, Cabbage, Cauliflower, Celery, (if low marsh land is available), Kohl-rabi, Lettuce, Onion, Tomato and Swedish Turnip. With all of these vegetables it will be necessary to plant the seed in seed beds and then transplant the young plants when 4 to 6 weeks old.

Department of Agriculture Leaflet, No. 5 (4th Edition) "Hints on Growing Vegetables" should be consulted for detailed information on the subject of Vegetable Gardening.

Flower Garden

During September, attention should be paid to the pruning of vines and tying in rampant growth. Mention was made earlier in this Calendar of the excessive plant growth which has occurred this summer, and this factor has also, of course, affected vine growth.

At this time of the year, sudden strong winds, and, of course, hurricanes, will do considerably more damage to top-heavy vines, than to those, where unnecessary wood has been reduced. Quite apart from the wind hazard, it is as well to prune back the more rampant growers at least once a year, to keep them in bounds. Such quick growers as Blue Sky Vine, Tecoma, Bougainvillea, Elaeagnus, and Jasmine, may rapidly take possession of a larger area than that allotted to them. They will easily choke out other desirable plants growing in close vicinity. Heavy pruning will not harm these vines, in fact it will stimulate future growth of young healthy wood.

Seed bed preparation should be undertaken toward the end of the month, ready for sowing the Spring flowering annuals, during next month. Be sure that an adequate supply of insecticides, and fungicides is on hand for use, should trouble occur in the seed beds after germination.

Freesias should be planted this month for flowering next Spring.

D. J. M.

WEATHER RECORDING STATION AT BOTANICAL GARDENS

Summary of Climatological data obtained at the Botanical Gardens during August, 1961

Mean maximum temperature 85.7
Mean minimum temperature 72.9
Mean monthly temperature 79.3
Absolute maximum 87.8 on August 1st
Absolute minimum 72.0 on August 8th
Rainfall 4.02 inches
No. of rain days 12